

Attorney's Docket No.: 17329-005001

Amendment to the Claims:

This listing of claims replaces all prior versions, and listings, of claims in the application:

1. (Currently Amended) A method for providing sequential data blocks each having a duration, ~~comprises~~ comprising:

providing repeating pre-scheduled multicasts of a data block;

dynamically initiating a transmission of the front portion of the data block in response to a user request to receive the data block from a user so as to serve the user outside the pre-scheduled multicasts of the data block as a dynamically admitted user; [and]

merging the dynamically admitted user into one of the [a] pre-scheduled multicasts of the data block;

wherein the dynamically initiated transmission is a multicast transmission that is sent to and is shared by a plurality of dynamically admitted users for the data block who are admitted in time to catch the beginning of the dynamically initiated multicast transmission.

2. (Previously Presented) The method according to claim 1, wherein each data block is a video comprising images viewed sequentially over time, whereby the video has a sequence and a duration, whereby the data block is a sequential data block having duration.

3. (Currently Amended) A method for providing videos to users, the method comprising:

multicasting a video according to a predetermined schedule, the multicasting hereinafter referred to as the first multicasting;

receiving an indication that a user desires to see the video;

in response to user requests from a plurality of users for the video outside the predetermined schedule for the first multicasting, dynamically initiating a multicast transmission of the video to at least a portion of the plurality of users whose requests are made in time to catch the beginning of the dynamically initiated multicast transmission;

if the first multicasting will not multicast the video timely for the user to receive and view the video with acceptably low waiting time, then dynamically initiating transmission of a portion of the video, the portion hereinafter referred to as the first portion of the video, wherein the user will receive at least some of the first portion of the video, and the user will receive another portion of the video, hereinafter referred to as the second portion of the video, via the first multicasting; and

if the first multicasting will multicast the video timely for the user to receive and view the video with acceptably low waiting time, then causing the user to receive the first multicasting without needing to receive the dynamically initiated transmission.

4. (Currently Amended) A method for providing videos to users, the method comprising:

multicasting a video according to a predetermined schedule, the multicasting hereinafter referred to as the first multicasting;

receiving an indication that a user desires to see the video;

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if the first multicasting will not multicast the video timely for the user to receive and view the video with acceptably low waiting time, then dynamically initiating transmission of a portion of the video, the portion hereinafter referred to as the first portion of the video, wherein the user will receive at least some of the first portion of the video, and the user will receive another portion of the video, hereinafter referred to as the second portion of the video, via the first multicasting; and

if the first multicasting will multicast the video timely for the user to receive and view the video with acceptably low waiting time, then causing the user to receive the first multicasting without needing to receive the dynamically initiated transmission,

~~The method according to claim 3,~~ wherein acceptably low waiting time is according to an adjustable threshold parameter, the method further comprising adjusting the threshold parameter dynamically for subsequent users who desire to see the video, to thereby reduce usage of transmission resources at a cost of increasing expected waiting time, by reducing likelihood of dynamically initiating transmission for the subsequent users, or to thereby reduce expected waiting time at a cost of increasing usage of transmission resources, by increasing likelihood of dynamically initiating transmission for the subsequent users.

5. (Currently Amended) A method for providing videos to users, the method comprising:

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multicasting a video according to a predetermined schedule, the multicasting hereinafter referred to as the first multicasting;

receiving an indication that a user desires to see the video;

if the first multicasting will not multicast the video timely for the user to receive and view the video with acceptably low waiting time, then dynamically initiating transmission of a portion of the video, the portion hereinafter referred to as the first portion of the video, wherein the user will receive at least some of the first portion of the video, and the user will receive another portion of the video, hereinafter referred to as the second portion of the video, via the first multicasting; and

if the first multicasting will multicast the video timely for the user to receive and view the video with acceptably low waiting time, then causing the user to receive the first multicasting without needing to receive the dynamically initiated transmission,

~~The method according to claim 3,~~ wherein acceptably low waiting time is according to an adjustable threshold parameter, further comprising automatically adjusting the threshold parameter dynamically to attempt to equalize an expected average waiting time for users who receive the dynamically initiated transmission for the video with an expected average waiting time for users who do not receive the dynamically initiated transmission for the video.

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6. (Currently Amended) A method for providing videos to users, the method comprising:

multicasting a video according to a predetermined schedule, the multicasting hereinafter referred to as the first multicasting;

receiving an indication that a user desires to see the video;

if the first multicasting will not multicast the video timely for the user to receive and view the video with acceptably low waiting time, then dynamically initiating transmission of a portion of the video, the portion hereinafter referred to as the first portion of the video, wherein the user will receive at least some of the first portion of the video, and the user will receive another portion of the video, hereinafter referred to as the second portion of the video, via the first multicasting; and

if the first multicasting will multicast the video timely for the user to receive and view the video with acceptably low waiting time, then causing the user to receive the first multicasting without needing to receive the dynamically initiated transmission,

~~The method according to claim 3,~~ wherein acceptably low waiting time is according to an adjustable threshold parameter, and the threshold parameter may be adjusted along a continuum for graceful degradation of waiting-time performance as number of users increases.

7. (Previously Presented) The method according to claim 3, wherein the first multicasting is such that once the user begins receiving any portion of the video via the first

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multicasting, then the user does not need to change channel to receive substantially the entire remainder of the video.

8. (Previously Presented) The method according to claim 3, wherein the predetermined schedule is established more than about six hours before the first multicasting.

9. (Previously Presented) The method according to claim 3, wherein the predetermined schedule includes multiple fixed start times for the video, wherein multicastings according to the multiple fixed start times overlap in time.

10. (Previously Presented) The method according to claim 3, wherein the dynamically initiating transmission of the first portion of the video comprises dynamically initiating multicasting of the first portion of the video, the dynamically initiated multicasting hereinafter referred to as the second multicasting.

11. (Previously Presented) The method according to claim 3, wherein the first multicasting is over one of a set of channels pre-assigned for multicasting the video according to the predetermined schedule, the set of channels hereinafter referred to as the first set of channels.

12. (Previously Presented) The method according to claim 11, wherein a second set of channels is pre-assigned for dynamically initiated transmission for the video.

13. (Previously Presented) The method according to claim 12, wherein the number of channels in the second set of channels

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is allocated to be at least about the number of channels in the first set of channels.

14. (Previously Presented) The method according to claim 3, wherein the video includes a front-most portion of the video, and the first portion includes the front-most portion of the video.

15. (Currently Amended) A method for providing videos to users, the method comprising:

multicasting a video according to a predetermined schedule, the multicasting hereinafter referred to as the first multicasting;

receiving an indication that a user desires to see the video;

if the first multicasting will not multicast the video timely for the user to receive and view the video with acceptably low waiting time, then dynamically initiating transmission of a portion of the video, the portion hereinafter referred to as the first portion of the video, wherein the user will receive at least some of the first portion of the video, and the user will receive another portion of the video, hereinafter referred to as the second portion of the video, via the first multicasting; and

if the first multicasting will multicast the video timely for the user to receive and view the video with acceptably low waiting time, then causing the user to receive the first multicasting without needing to receive the dynamically initiated transmission,

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~~The method according to claim 3,~~ wherein the dynamically initiated transmission includes a patching multicast for continuing a front-most portion of the video that was stored at one of multiple prefix storage sites.

16. (Previously Presented) The method according to claim 3, wherein the first multicasting and the dynamically initiated transmission are both served from a same server.

17. (Currently Amended) The method according to claim 3, further comprising: wherein the user receives and buffers causing the second portion of the video to be received and buffered by the user while the user is receiving and viewing the at least some of the first portion of the video, and then causing views the buffered second portion of the video, time shifted, to be transmitted to and viewed by the user to thereby provide seamlessly viewing of the at least some of the first portion of the video and the second portion of the video the user.

18. (Currently Amended) The method according to claim 17, further comprising: using video buffering and an existing multicasting according to the predetermined schedule to provide pausing and resuming functions to a user wherein the user pauses and resumes viewing of the video at will without incurring additional resource expenditure by any server or network element involved in the first multicast or the dynamically initiated transmission.

19. (Currently Amended) The method according to claim 17, wherein the user views the video in slow motion at will further comprising using video buffering and an existing multicasting

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according to the predetermined schedule to play the video in slow motion at a request of a user without incurring additional resource expenditure by any server or network element involved in the first multicast or the dynamically initiated transmission.

20. (Currently Amended) The method according to claim 17, ~~wherein the user can~~ further comprising using video buffering and an existing multicasting according to the predetermined schedule to allow a user to seek to an approximate new point in the video at will without incurring additional resource expenditure by any server or network element involved in the first multicast or the dynamically initiated transmission, and initiating an additional dynamically initiated transmission to provide a user with a precise seek to a new point in the video ~~wherein the user can seek to a precise new point in the video at will but will require an additional dynamically initiated transmission from a server.~~

21. (Currently Amended) A method for providing videos to users, the method comprising:

multicasting a video according to a predetermined schedule, the multicasting hereinafter referred to as the first multicasting;

receiving an indication that a user desires to see the video;

if the first multicasting will not multicast the video timely for the user to receive and view the video with acceptably low waiting time, then dynamically initiating transmission of a portion of the video, the portion hereinafter

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referred to as the first portion of the video, wherein the user will receive at least some of the first portion of the video, and the user will receive another portion of the video, hereinafter referred to as the second portion of the video, via the first multicasting; and

if the first multicasting will multicast the video timely for the user to receive and view the video with acceptably low waiting time, then causing the user to receive the first multicasting without needing to receive the dynamically initiated transmission,

~~The method according to claim 3,~~ wherein the receiving step comprises receiving at a server, from one of multiple controllers, the indication that a user desires to see the video, wherein the one controller itself received multiple requests for multiple users to receive the video, but the one controller sent fewer indications to the server than the multiple received requests.

22. (Currently Amended) A method for providing videos to users, the method comprising:

multicasting a video according to a predetermined schedule, the multicasting hereinafter referred to as the first multicasting;

receiving an indication that a user desires to see the video;

if the first multicasting will not multicast the video timely for the user to receive and view the video with acceptably low waiting time, then dynamically initiating transmission of a portion of the video, the portion hereinafter

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referred to as the first portion of the video, wherein the user will receive at least some of the first portion of the video, and the user will receive another portion of the video, hereinafter referred to as the second portion of the video, via the first multicasting;

if the first multicasting will multicast the video timely for the user to receive and view the video with acceptably low waiting time, then causing the user to receive the first multicasting without needing to receive the dynamically initiated transmission,

~~The method according to claim 3, further comprising-~~

accepting proposed system parameters including number of channels, number of videos, allocation of channels, and a threshold parameter that is indicative of an acceptably low waiting time;

accepting expected user arrival rates; and

computing and outputting an approximate expected average wait time ~~for the method~~ based on the proposed system parameters and the expected user arrival rates[,] by using numeric solutions to a performance model;

wherein sufficiency of proposed system parameters can be approximately determined.

23. (Currently Amended) A method for providing videos to users, the method comprising:

multicasting a video according to an earlier determined schedule, the multicasting hereinafter referred to as the first multicasting;

receiving at least one request that is indicative that a user desires to see the video; and

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in response at least in part to the request, dynamically multicasting a portion of the video to the user and at least one additional user requesting for the video outside the predetermined schedule for the first multicasting in time to catch the beginning of the dynamically initiated multicasting;

wherein at least one user receives the portion of the video, hereinafter referred to as the first portion of the video, from the dynamically multicasting; the at least one user receives, from the first multicasting, at least a portion of the video, hereinafter referred to as the second portion of the video; and the at least one user plays the first portion of the video followed by the second portion of the video.

24. (Previously Presented) The method according to claim 23, wherein the first multicasting is such that once a user begins receiving the first multicasting, then further communication for channel establishment is not required between the user and any network element that delivers the video to receive substantially the entire remainder of the video.

25. (Previously Presented) The method according to claim 23, wherein start time for any given multicast in the earlier determined schedule are not in response to any arrival of a user who will receive the given multicast, whereby even if no user is expected to watch the given multicast, the given multicast still takes place at its earlier determined start time.

26. (Previously Presented) The method according to claim 23, wherein multiple prefix servers are not used in conjunction with the dynamically multicasting.

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27. (Currently Amended) A method for providing videos to users, the method comprising:

multicasting a video according to an earlier determined schedule, the multicasting hereinafter referred to as the first multicasting;

receiving at least one request that is indicative that a user desires to see the video; and

in response at least in part to the request, dynamically multicasting a portion of the video;

wherein at least one user receives the portion of the video, hereinafter referred to as the first portion of the video, from the dynamically multicasting; the at least one user receives, from the first multicasting, at least a portion of the video, hereinafter referred to as the second portion of the video; and the at least one user plays the first portion of the video followed by the second portion of the video, and

~~The method according to claim 23,~~ wherein the dynamically multicasting is a patching multicasting used in connection with multiple prefix servers.

28. (Previously Presented) The method according to claim 23, wherein the first multicasting and the dynamically multicasting are both served from a same server.

29. (Currently Amended) A method for providing videos to users, the method comprising:

(a) receiving a request from a user to receive a video at a controller;

(b) producing a statically scheduled multicast of the video to serve each user who requests for the video within a threshold time parameter prior to the beginning of the statically scheduled multicast of the video if an upcoming

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~~statically scheduled multicast of the video will begin within a threshold time parameter, then arranging for the user to receive the upcoming statically scheduled multicast of the video, thereby satisfying the request from the user and reframing from subsequent steps listed below;~~

(c) ~~otherwise, if no new multicast for the video is currently being dynamically scheduled, then~~ sending a request toward a server to begin dynamically scheduling a new multicast for the video in response to requests for the video from a plurality of users that are not within the threshold time parameter prior to the beginning of the statically scheduled multicast of the video, and continuing with subsequent steps listed below; and

(d) receiving a confirmation at the controller that the new multicast for the video has been dynamically scheduled, and, in response, arranging for the ~~user~~ users to share and to receive the upcoming dynamically scheduled new multicast for the video, wherein the new multicast for the video includes will include less than the entire video;

(e) causing the user whose request is not within the threshold time parameter to receive and buffer wherein the user receives and buffers an in-progress pre-scheduled multicast of the video, the user receives and views and to receive playback of the dynamically scheduled new multicast for the video; and, and the users begins to view content from the user's buffer from the in-progress pre-scheduled multicast after the dynamically scheduled new multicast has caught up to the content from the user's buffer.

causing the buffered portion of the pre-scheduled multicast of the video to be played for the user after the dynamically scheduled new multicast has caught up to the buffered portion of the video.

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30. (Previously Presented) The method of claim 29, further comprising:

(f) receiving a number of additional requests from additional users to receive the video at the controller in between execution of the steps (c) and (d); and

(g) refraining from sending additional requests toward the server in response to the additional requests until, in the step (d), receiving the confirmation at the controller that the new multicast for the video has been dynamically scheduled, and then:

(h) arranging for the additional users to receive the upcoming dynamically scheduled new multicast for the video; and

(i) sending a request toward the server to increase the amount of the video to include in the new multicast for the video, to thereby accommodate the additional users.

31. (Currently Amended) A system for providing videos to users, the system comprising:

means for multicasting a video according to a predetermined schedule, the multicasting hereinafter referred to as the first multicasting;

means for receiving an indication that a user desires to see the video;

means for, if the first multicasting will not multicast the video timely for the user to receive and view the video with acceptably low waiting time according to a threshold parameter, then dynamically initiating transmission of a portion of the video, the portion hereinafter referred to as the first portion of the video,

wherein the user will receive at least some of the first portion of the video, and the user will receive another portion

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of the video, hereinafter referred to as the second portion of the video, via the first multicasting;

means for multicasting the dynamically initiated transmission of the portion of the video to a plurality of users requesting for the video in time to catch the beginning of the dynamically initiated multicast; and

means for, if the first multicasting will multicast the video timely for the user to receive and view the video with acceptably low waiting time according to the threshold parameter, then causing the user to receive the first multicasting without needing to receive the dynamically initiated transmission.

32. (Previously Presented) The system according to claim 31, wherein the means for multicasting is configured such that once the user begins receiving any portion of the video via the first multicasting, then the user does not need to change channel to receive substantially the entire remainder of the video.

33. (Previously Presented) The system according to claim 31, wherein the predetermined schedule includes multiple fixed start times for the video, wherein multicastings according to the multiple fixed start times overlap in time.

34. (Previously Presented) The system according to claim 31, wherein the dynamically initiating transmission of the first portion of the video comprises dynamically initiating multicasting of the first portion of the video, the dynamically initiated multicasting hereinafter referred to as the second multicasting.

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35. (Currently Amended) A system for providing videos to users, the system comprising:

means for multicasting a video according to a predetermined schedule, the multicasting hereinafter referred to as the first multicasting;

means for receiving an indication that a user desires to see the video;

means for, if the first multicasting will not multicast the video timely for the user to receive and view the video with acceptably low waiting time according to a threshold parameter, then dynamically initiating transmission of a portion of the video, the portion hereinafter referred to as the first portion of the video,

wherein the user will receive at least some of the first portion of the video, and the user will receive another portion of the video, hereinafter referred to as the second portion of the video, via the first multicasting; and

means for, if the first multicasting will multicast the video timely for the user to receive and view the video with acceptably low waiting time according to the threshold parameter, then causing the user to receive the first multicasting without needing to receive the dynamically initiated transmission,

~~The system according to claim 31, wherein:~~

the means for multicasting comprises a set of channels pre-assigned for multicasting the video according to the predetermined schedule;

the means for dynamically initiating transmission comprises a second set of channels preassigned for dynamically initiated transmission for the video; and the number of channels in the second set of channels is allocated to be about the number of channels in the first set of channels.

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36. (Currently Amended) A system for providing videos to users, the system comprising:

means for multicasting a video according to an earlier determined schedule, the multicasting hereinafter referred to as the first multicasting;

means for receiving at least one request that is indicative that a user desires to see the video; [and]

means for, in response at least in part to the request, dynamically multicasting a portion of the video; and

means for sharing the dynamically multicast portion of the video among a plurality of users requesting for the video in time to catch the beginning of the dynamically multicast portion of the video,

wherein at least one user receives the portion of the video, hereinafter referred to as the first portion of the video, from the dynamically multicasting; the at least one user receives, from the first multicasting, at least a portion of the video, hereinafter referred to as the second portion of the video; and the at least one user plays the first portion of the video followed by the second portion of the video.

37. (Previously Presented) The system according to claim 36, wherein the first multicasting is such that once a user begins receiving the first multicasting, then further communication for channel establishment is not required between the user and any network element that delivers the video to receive substantially the entire remainder of the video.

38. (Previously Presented) The system according to claim 36, wherein start time for any given multicast in the earlier determined schedule are not in response to any arrival of a user

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who will receive the given multicast, whereby even if no user is expected to watch the given multicast, the given multicast still takes place at its earlier determined start time.

39. **(Currently Amended)** A system for providing videos to users, the system comprising:

means for receiving a request from a user to receive a video at a controller;

means for, if an upcoming statically scheduled multicast of the video will begin within a threshold time parameter, then arranging for the user to receive the upcoming statically scheduled multicast of the video, thereby satisfying the request from the user;

means for, otherwise, if no new multicast for the video is currently being dynamically scheduled, then sending a request toward a server to begin dynamically scheduling a new multicast for the video; [and]

means for receiving a confirmation at the controller that the new multicast for the video has been dynamically scheduled, and, in response, arranging for the user to receive the upcoming dynamically scheduled new multicast for the video, wherein the new multicast for the video includes ~~will include~~ less than the entire video; and

means for sharing the dynamically scheduled new multicast for the video among a plurality of users requesting for the video in time to catch the beginning of the dynamically scheduled new multicast for the video,

wherein the user receives and buffers an in-progress pre-scheduled multicast of the video, the user receives and views the dynamically scheduled new multicast for the video, and the users begins to view content from the user 's buffer from the in-progress pre-scheduled multicast after the dynamically

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scheduled new multicast has caught up to the content from the user 's buffer.

40. (Previously Presented) The system of claim 39, further comprising:

means for receiving a number of additional requests from additional users to receive the video at the controller and refraining from sending additional requests toward the server in response to the additional requests until receiving the confirmation at the controller that the new multicast for the video has been dynamically scheduled; and

means for then arranging for the additional users to receive the upcoming dynamically scheduled new multicast for the video and sending a request toward the server to increase the amount of the video to include in the new multicast for the video, to thereby accommodate the additional users.

41. (Currently Amended) A system for providing video content, the system comprising:

at least one server, the at least one server configured to multicast a video via a network according to a fixed predetermined schedule and to dynamically initiate transmission of a portion of the video, hereinafter referred to as the first portion of the video, for at least one user, hereinafter referred to as the at least one dynamic user; and

a controller configured to receive requests from users to see a video and to indicate, to the at least one server, user interest to see the video, including interest by at least one of the at least one dynamic user, the controller operable to control the at least one server to serve a user via either the video multicast according to the fixed predetermined schedule or the dynamically initiated transmission;

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wherein the at least one dynamic user receives at least part of the first portion of the video, and the at least one dynamic user also receives a portion of the video, hereinafter referred to as the second portion of the video, via the multicast according to the fixed predetermined schedule, and the first portion of the video includes video content not within the second portion of the video, and the at least one dynamic user is able to begin viewing the at least part of the first portion of the video and then to switch to viewing the second portion of the video, and

wherein the controller and the at least one server are further operable to, in response to user requests from a plurality of users for the video outside the video multicast according to the fixed predetermined schedule, direct the dynamically initiated transmission as a multicast to the plurality of users when the requests are made in time to catch the beginning of the dynamically initiated transmission multicast.

42. (New) The method according to claim 1, wherein a length of the front portion of the data block is variable according to a greatest duration of the portion of the video that is needed by the dynamically admitted users.

43. (New) The method according to claim 3, wherein a length of the first portion is variable according to a greatest duration of the portion of the video that is needed by the dynamically admitted users.

44. (New) The method according to claim 23, wherein a length of the first portion is variable according to a greatest

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duration of the portion of the video that is needed by the dynamically admitted users.

45. (New) The system according to claim 31, wherein the system further comprises means for determining a length of the first portion is variable according to a greatest duration of the portion of the video that is needed by the dynamically admitted users.

46. (New) The system according to claim 36, wherein the system further comprises means for determining a length of the first portion is variable according to a greatest duration of the portion of the video that is needed by the dynamically admitted users.

47. (New) A video-on-demand system, comprising:

at least one server operable multicast a video to a network connected to users according to a fixed multicast schedule to deliver the video;

at least one prefix cache server in the network to store an initial prefix portion of each of available videos in the network including the video; and

a controller operable to control the at least one server and the one prefix cache server in delivering the video to the users,

wherein the controller is operable to serve the initial prefix portion of the video from the at least one prefix cache server to a user who requests for the video outside the fixed multicast schedule and to dynamically initiate transmission of at least a portion of the video to serve, at the end of the serving of the initial prefix portion of the video, the user who requests for the video outside the fixed multicast schedule, and

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wherein the controller is further operable to use a buffered multicast of the video to serve the user who requests for the video outside the fixed multicast schedule and to stop serving the user from the dynamically initiated transmission.

48. (New) The system as in claim 47, wherein the controller and the at least one server are further operable to, in response to requests from a plurality of users for the video outside the video multicast according to the fixed multicast schedule, direct the dynamically initiated transmission as a multicast to the plurality of users when the requests are made in time to catch the beginning of the dynamically initiated transmission multicast.